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of trained divers from European Russia, and the prospects for a satisfactory yield of pearls are considered to be good.<sup>4</sup>

GEO. F. KUNZ

### SPECIAL ARTICLES

#### THE DOCOPHORI OF THE OWLS

EXACTLY a dozen species of *Docophorus* (genus of Mallophagan parasites) have been described from the owls (*Strigidae*). I think the number is about double what it ought to be. The species center about three well-known and well-differentiated types, represented by the long-established species, *D. rostratus* Nitzsch, *D. cursor* Nitzsch and *D. ceblebrachys* Nitzsch. The name of Nitzsch means that these three species were described about a hundred years ago and were based on specimens derived from European birds. All of these species have since been taken from North American owls, as well as from owl hosts from other parts of the world.

The three species differ markedly from each other in various characters, the most quickly recognizable of which are the shape and markings of the head. In *rostratus* the clypeal portion of the head is drawn out and narrow in front, in *cursor* it is shorter and broader, and in *ceblebrachys* it is still shorter and broader, so that the head is a sort of broad, solid, bull's head. The species might well have been named *taurocephalus*, a name used later by me for another *Docophorus*.

Of the nine other so-called species of owl *Docophori* three have been described from American specimens, viz., *D. syrnii* by Packard from *Strix varia varia* from Ohio; *D. bubonis* by Osborn from *Bubo virginianus* from Pennsylvania, and *D. speotyti*, also by Osborn, from *Speotyto cunicularia hypogæa* from Nebraska and Colorado. *D. syrnii* Packard is unrecognizable. It does not count. Professor Osborn's two species do count, of course. They belong to the *cursor* type of owl *Docophori* and are very partial, indeed, to this type, for they imitate their European

model pretty closely. However, Professor Osborn's specimens are different from Nitzsch's. But that is a conspicuous thing about the Mallophaga. The individuals of the same species, when they are taken from different host individuals, reveal easily perceived differences. It is a condition that comes about, probably, through the unusual isolation of the separate groups of individuals that compose the species. Each group, which is at bottom a family group, and represents a family strain, is more or less effectively marooned on an animated island, which is the body of its individual bird host. And hence the variations of each family strain are preserved and accentuated by the necessary inbreeding due to this isolation.

Thus while Professor Osborn's *cursor*-like species are different, they are not *very* different, and the same is true of several other species of owl *Docophori* representing not only the *cursor* type but the *ceblebrachys* and the *rostratus* type.

I have just received from Professor Cockerell several specimens of *Docophorus* from *Asio flammea* (collected at Boulder, Colorado) and in attempting to determine them I am interested to discover that if I follow tradition I shall have to add another species of *Docophorus* to the list for the owls, which would make the thirteenth! This makes me hesitate. What I believe ought to be done is to let these new specimens unite some friendly but now separated species, instead of compelling them to make the situation more intolerable. For to recognize thirteen species of one Mallophagan genus from thirteen species of owls—for that happens to be the exact number of owl species from which *Docophori* have been taken—and four of them from a single owl kind, would be unnatural, and also most inviting of ill luck! I am sure of the unnaturalness from my knowledge of the host distribution of the Mallophaga. The trouble is that the isolation of the *Docophorus* (and other Mallophagan) individuals on owls is even more effective than on most other birds, for owls are peculiarly non-gregarious and

<sup>4</sup> Report of Consul John F. Jewell, of Vladivostok.

offer unusually little opportunity for the passage from host to host of the wingless parasites. There is thus all too little cross-breeding, and family idiosyncrasies get all too easily preserved and made the basis of species separation. What I propose to do then, in a forthcoming systematic paper on the Mallophaga, is to reduce the number of species of owl *Docophori* and of some other similarly expanded groups. This present note is simply notice to that effect, with a suggestion of the biological reason why.

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#### ŒNOTHERA AND CLIMATE

IN their interesting account of a recent visit to Bartram's locality for *Œnothera grandiflora*, at Dixie Landing on the Alabama River, Professor de Vries and Mr. Bartlett<sup>1</sup> say:

Neither *Œ. grandiflora* nor *Œ. Tracyi* has heretofore been known as other than annual, and the abundance of rosettes which would obviously not flower this season was therefore a point of great interest.

In growing *Œ. grandiflora* and many other *Œnotheras* under a variety of climatic conditions, I have been greatly struck by the different ways in which they respond, both as regards the annual or biennial habit and the time of flowering in a given season. Seeds of a series of *Œnothera grandiflora* forms from Birkenhead, England, which I planted in a tropical greenhouse at the University of Chicago in July, 1907,<sup>2</sup> were grown under tropical conditions, the plants remaining rosettes throughout the winter and flowering in May, 1908. *Œ. Lamarckiana* forms treated in the same manner nearly all remained rosettes indefinitely, *i. e.*, for about twenty-two months, until the experiments were suspended. This difference in behavior I at-

tributed to the fact that *Œ. grandiflora* is adapted to a more southern climate than *Œ. Lamarckiana*. In 1909 I observed typical rosettes of *Œ. grandiflora* growing in mid-summer (probably as escapes) in uncultivated land of the Missouri Botanical Garden. Hence in that climate also the plant is biennial. From these and related facts, together with the observations of de Vries and Bartlett, it is probable that all the *Œnotheras* of this group are biennial in their native localities.

When grown from seeds planted in the greenhouse in January or March, *Œ. grandiflora* often omits entirely the rosette stage, beginning to form a stalk when quite a young seedling. In my cultures under these conditions the characteristic leaf-type of the mature rosette is always omitted. The plant, therefore, unlike the *Œ. Lamarckiana* forms, becomes annual by shortening its life cycle.

Plants of *Œ. grandiflora* grown from seeds from Dixie Landing behaved in still a different way in the English climate this year. Seeds were sown in the greenhouse in January, and the young seedlings planted out in the end of May. They formed very imperfect rosettes but, though stem-formation began early and they grew luxuriantly, yet they failed almost completely to come into bloom, only two plants out of two hundred and twenty-one producing any flowers.

Incidentally it may be mentioned that, as I have pointed out elsewhere,<sup>3</sup> *Œ. grandiflora* occurred in the region of Carolina and Virginia as late as 1821 (Barton's "Flora of North America," Vol. I., plate 6). It would be worth careful search to discover if individuals do not still survive in this region, for that was undoubtedly the source of the large-flowered *Œnothera* described by Ray in the "Historia Plantarum," 1686, and which must have belonged to a race either of *Œ. grandiflora* or of *Œ. Lamarckiana*.

Seeds which I obtained from Birmingham,

<sup>1</sup> De Vries, Hugo, and Bartlett, H. H., "The Evening Primroses of Dixie Landing, Alabama," SCIENCE, N. S., 36: 599-601, 1912.

<sup>2</sup> See Gates, R. R., "An Onagraceous Stem without Internodes," *New Phytologist*, 11: 50-53, pls. 2-3, 1912.

<sup>3</sup> Gates, R. R., "Early Historical-botanical Records of the *Œnotheras*," *Proc. Iowa Acad. Sci.*, 1910, p. 108.